IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OHIO EASTERN DIVISION

IN RE NATIONAL : MDL No. 2804

PRESCRIPTION OPIATE :

LITIGATION : CASE NO. 1:17-MD-2804

Lake County and Trumbull

County, OH Case

SUPPLEMENTAL EXPERT REPORT OF

CRAIG J. MCCANN, Ph.D., CFA

May 4, 2021

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I. Qualifications and Remuneration

1. On April 16, 2021, I filed an Expert Report (the "McCann Report") in this matter. My Qualifications and Remuneration are contained in the McCann Report §1 and are unchanged.

A. Materials Reviewed

2. The list of Materials Reviewed in preparing the McCann Report is contained in the McCann Report §2.

B. Assignment

- 3. I documented how I processed, validated and augmented opioid transaction data produced by the Drug Enforcement Administration ("DEA") in the McCann Report. I also reported the results of running certain flagging algorithms on the processed ARCOS data. The ARCOS data had some missing transactions which I have since filled in with Defendants' Transactional Data produced in discovery. I highlighted this issue in the McCann Report using Walmart's ARCOS data and its data produced in Discovery.
- 4. I have been asked to file this report (the "Supplemental McCann Report") to report the results of applying the flagging algorithms to the processed ARCOS data supplemented with the missing transactions found in the Defendants' Transactional Data, and fix a typo in the McCann Report.¹

II. Lake County and Trumbull County, OH Distributor Summary

5. The flagging methodologies described in Section VII of the McCann Report are used to identify transactions meeting specified criteria

¹ In §278 of McCann Report, the data range for Rite Aid dispensing data should be "January 2006-November 2019".

using the ARCOS Data, supplemented with the Defendants' Transactional Data. The detailed results are reported in the Supplemental Appendix 8A.

A. Method 1: Maximum Monthly, Trailing Six-month Threshold

1. Lake County Summary

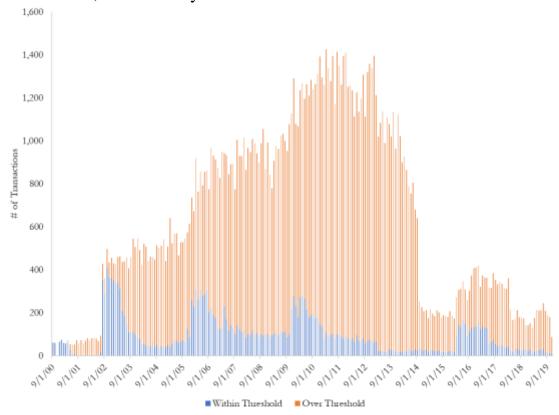
6. Supplemental Table 30 reports Total MME and % of Total MME in transactions flagged in Lake County using the Trailing Six-Month Maximum Threshold.

Supplemental Table 30 Trailing Six-Month Maximum Threshold Flagged Transactions, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	0	0.0%
2001	860,018	548,022	63.7%
2002	5,248,812	1,101,219	21.0%
2003	13,080,589	5,548,715	42.4%
2004	14,812,415	10,468,099	70.7%
2005	18,006,836	12,319,689	68.4%
2006	27,694,352	16,774,475	60.6%
2007	32,917,019	24,229,677	73.6%
2008	36,450,880	29,461,066	80.8%
2009	39,574,741	31,643,332	80.0%
2010	44,625,937	36,193,619	81.1%
2011	47,450,511	40,172,984	84.7%
2012	41,680,846	36,010,620	86.4%
2013	25,276,076	22,946,129	90.8%
2014	16,212,200	14,580,016	89.9%
2015	7,762,299	6,591,083	84.9%
2016	12,810,506	6,542,433	51.1%
2017	13,975,875	9,600,308	68.7%
2018	8,535,946	7,336,709	86.0%
2019	6,202,341	5,550,086	89.5%
Total	413,377,164	317,618,281	76.8%

7. Supplemental Figure 12 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Trailing Six-Month Maximum Threshold methodology. The Trailing Six-Month Maximum Threshold methodology flags 85.3% of transactions accounting for 92.6% of Dosage Units, 76.8% of MME and 90.3% of drug weight shipped into Lake County.

Supplemental Figure 12 Trailing Six-Month Maximum Threshold Flagged Transactions, Lake County 2000 to 2019



8. Supplemental Table 31 summarizes the transactions flagged based on the Trailing Six-Month Maximum Threshold Approach in Lake County.

Supplemental Table 31 Trailing Six-Month Maximum Threshold Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	19,760	n/a	n/a	n/a	1,243	21,003
HBC Service Company	3,809	15,375	12	0	20	453	19,669
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	12,110	n/a	n/a	n/a	519	12,629
Wal-Mart	11,137	14,685	1,391	323	0	663	28,199
Walgreen Co	16,735	20,081	5,176	879	0	1,510	44,381
Total	31,681	82,011	6,579	1,202	20	4,388	125,881

2. Trumbull County Summary

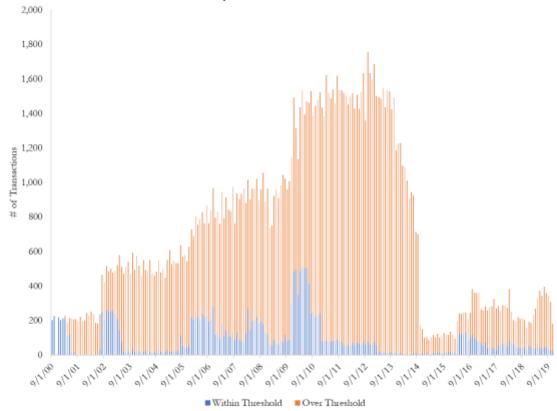
9. Supplemental Table 32 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Trailing Six-Month Maximum Threshold.

Supplemental Table 32 Trailing Six-Month Maximum Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	0	0.0%
2001	2,906,501	1,951,043	67.1%
2002	6,113,438	3,434,133	56.2%
2003	12,407,747	9,333,319	75.2%
2004	13,065,304	11,629,534	89.0%
2005	15,173,028	12,830,266	84.6%
2006	22,085,748	15,648,850	70.9%
2007	27,694,027	21,675,192	78.3%
2008	37,533,489	28,455,349	75.8%
2009	38,742,283	31,411,925	81.1%
2010	52,769,118	41,604,417	78.8%
2011	57,513,529	51,823,500	90.1%
2012	58,010,505	53,205,239	91.7%
2013	35,985,699	34,677,493	96.4%
2014	21,323,955	20,939,147	98.2%
2015	5,235,834	4,655,256	88.9%
2016	11,801,204	7,191,018	60.9%
2017	15,591,459	12,591,811	80.8%
2018	12,089,539	9,204,198	76.1%
2019	11,705,528	9,912,239	84.7%
Total	458,435,665	382,173,929	83.4%

10. Supplemental Figure 13 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Trailing Six-Month Maximum Threshold methodology. The Trailing Six-Month Maximum Threshold methodology flags 86.9% of transactions accounting for 93.3% of Dosage Units, 83.4% of MME and 90.8% of drug weight shipped into Trumbull County.

Supplemental Figure 13 Trailing Six-Month Maximum Threshold Flagged Transactions, Trumbull County 2000 to 2019



11. Supplemental Table 33 summarizes the transactions flagged based on the Trailing Six-Month Maximum Threshold Approach in Trumbull County.

Supplemental Table 33 Trailing Six-Month Maximum Threshold Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	17,792	n/a	n/a	n/a	798	18,590
HBC Service Company	4,431	25,660	146	0	0	593	30,830
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	36,199	n/a	n/a	n/a	1,191	37,390
Wal-Mart	5,737	12,835	52	0	0	420	19,044
Walgreen Co	12,472	20,500	2,233	0	0	946	36,151
Total	22,640	112,986	2,431	0	0	3,948	142,005

B. Method 2: Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold

1. Lake County Summary

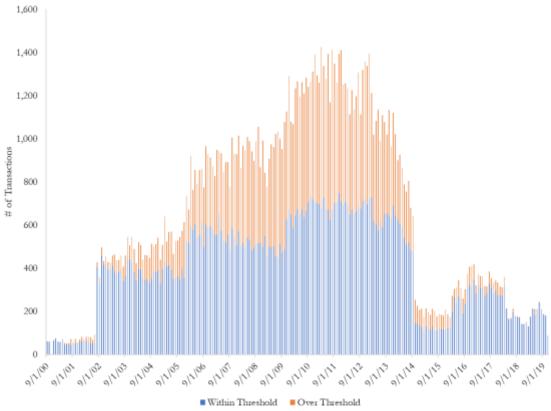
12. Supplemental Table 34 reports Total MME and % of Total MME in transactions flagged in Lake County using the Trailing Six-Month Maximum, Fixed After Triggered Threshold.

Supplemental Table 34 Trailing Six-Month Maximum, Fixed After Triggered Threshold Flagged Transactions, Lake County, Total MME and % MME

	,	J ,	
Year	Defendants' Total MME	Flagged MMF	%
		Flagged MME	
2000	198,963	0	0.0%
2001	860,018	140,484	16.3%
2002	5,248,812	380,207	7.2%
2003	13,080,589	1,516,668	11.6%
2004	14,812,415	2,961,632	20.0%
2005	18,006,836	4,567,421	25.4%
2006	27,694,352	8,304,226	30.0%
2007	32,917,019	12,622,679	38.3%
2008	36,450,880	17,554,829	48.2%
2009	39,574,741	20,294,490	51.3%
2010	44,625,937	24,361,380	54.6%
2011	47,450,511	26,609,090	56.1%
2012	41,680,846	22,631,339	54.3%
2013	25,276,076	12,962,302	51.3%
2014	16,212,200	7,778,068	48.0%
2015	7,762,299	3,417,957	44.0%
2016	12,810,506	2,908,786	22.7%
2017	13,975,875	2,516,450	18.0%
2018	8,535,946	732,970	8.6%
2019	6,202,341	186,031	3.0%
Total	413,377,164	172,447,009	41.7%

13. Supplemental Figure 14 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Trailing Sixmonth Maximum Monthly, Fixed After First Triggered Threshold methodology. The Trailing Sixmonth Maximum Monthly, Fixed After First Triggered Threshold methodology flags 37.3% of transactions accounting for 47.4% of Dosage Units, 41.7% of MME and 44.4% of drug weight shipped into Lake County.

Supplemental Figure 14 Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Flagged Transactions, Lake County 2000 to 2019



14. Supplemental Table 35 summarizes the transactions flagged based on the Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Approach in Lake County.

Supplemental Table 35 Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	10,123	n/a	n/a	n/a	280	10,403
HBC Service Company	173	1,983	1	0	2	103	2,262
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	6,196	n/a	n/a	n/a	53	6,249
Wal-Mart	6,101	5,754	283	14	0	230	12,382
Walgreen Co	10,579	10,510	2,307	72	0	225	23,693
Total	16,853	34,566	2,591	86	2	891	54,989

2. Trumbull County Summary

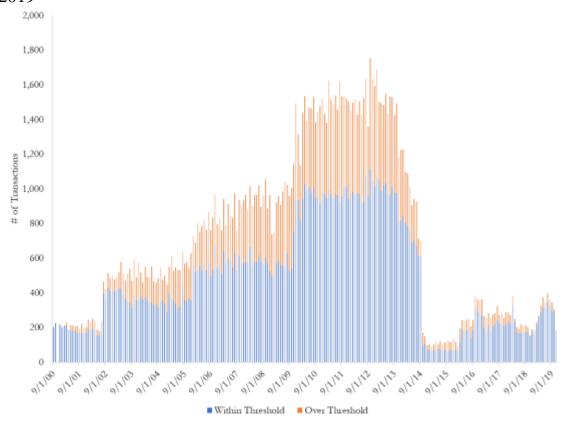
15. Supplemental Table 36 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Trailing Six-Month Maximum, Fixed After Triggered Threshold.

Supplemental Table 36 Trailing Six-Month Maximum, Fixed After Triggered Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	0	0.0%
2001	2,906,501	384,911	13.2%
2002	6,113,438	932,467	15.3%
2003	12,407,747	3,280,689	26.4%
2004	13,065,304	3,916,171	30.0%
2005	15,173,028	5,145,493	33.9%
2006	22,085,748	6,681,507	30.3%
2007	27,694,027	9,679,526	35.0%
2008	37,533,489	15,467,186	41.2%
2009	38,742,283	16,651,162	43.0%
2010	52,769,118	24,104,555	45.7%
2011	57,513,529	30,006,322	52.2%
2012	58,010,505	31,064,188	53.5%
2013	35,985,699	17,094,574	47.5%
2014	21,323,955	8,809,163	41.3%
2015	5,235,834	2,295,357	43.8%
2016	11,801,204	3,188,269	27.0%
2017	15,591,459	4,490,759	28.8%
2018	12,089,539	1,982,221	16.4%
2019	11,705,528	1,499,971	12.8%
Total	458,435,665	186,674,491	40.7%

16. Supplemental Figure 15 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Trailing Sixmonth Maximum Monthly, Fixed After First Triggered Threshold methodology. The Trailing Sixmonth Maximum Monthly, Fixed After First Triggered Threshold methodology flags 32.0% of transactions accounting for 41.4% of Dosage Units, 40.7% of MME and 40.4% of drug weight shipped into Trumbull County.

Supplemental Figure 15 Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Flagged Transactions, Trumbull County 2000 to 2019



17. Supplemental Table 37 summarizes the transactions flagged based on the Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Approach in Trumbull County.

Supplemental Table 37 Trailing Six-month Maximum Monthly, Fixed After First Triggered Threshold Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	4,429	n/a	n/a	n/a	104	4,533
HBC Service Company	958	1,669	9	0	0	95	2,731
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	21,552	n/a	n/a	n/a	212	21,764
Wal-Mart	2,497	1,832	3	0	0	66	4,398
Walgreen Co	7,674	10,820	217	0	0	107	18,818
Total	11,129	40,302	229	0	0	584	52,244

C. Method 3: Twice Trailing Twelve-Month Average Pharmacy Dosage Units

1. Lake County Summary

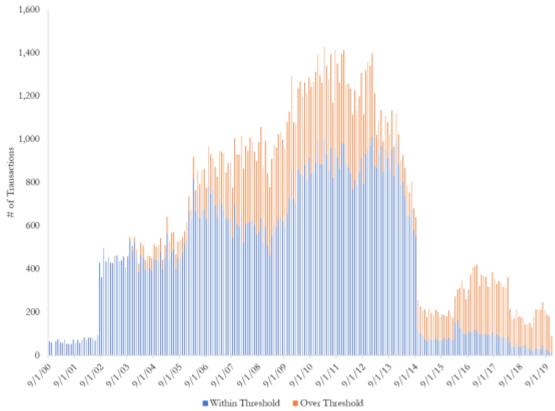
18. Supplemental Table 38 reports Total MME and % of Total MME in transactions flagged in Lake County using the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold.

Supplemental Table 38 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	0	0.0%
2001	860,018	0	0.0%
2002	5,248,812	0	0.0%
2003	13,080,589	369,971	2.8%
2004	14,812,415	3,546,840	23.9%
2005	18,006,836	5,280,183	29.3%
2006	27,694,352	8,384,420	30.3%
2007	32,917,019	15,472,112	47.0%
2008	36,450,880	22,509,475	61.8%
2009	39,574,741	24,746,885	62.5%
2010	44,625,937	26,471,446	59.3%
2011	47,450,511	28,511,097	60.1%
2012	41,680,846	24,607,089	59.0%
2013	25,276,076	11,520,238	45.6%
2014	16,212,200	7,620,308	47.0%
2015	7,762,299	6,355,829	81.9%
2016	12,810,506	9,649,017	75.3%
2017	13,975,875	11,116,148	79.5%
2018	8,535,946	6,507,453	76.2%
2019	6,202,341	5,102,670	82.3%
Total	413,377,164	217,771,182	52.7%

19. Supplemental Figure 16 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology. The Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology flags 29.5% of transactions accounting for 33.4% of Dosage Units, 52.7% of MME and 46.9% of drug weight shipped into Lake County.

Supplemental Figure 16 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019



20. Supplemental Table 39 summarizes the transactions flagged based on the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Approach in Lake County.

Supplemental Table 39 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	0	n/a	n/a	n/a	577	577
HBC Service Company	4,178	1,436	153	31	97	509	6,404
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	2,058	n/a	n/a	n/a	286	2,344
Wal-Mart	9,527	0	1,315	547	29	2,121	13,539
Walgreen Co	10,165	0	4,762	1,227	33	4,565	20,752
Total	23,870	3,494	6,230	1,805	159	8,058	43,616

2. Trumbull County Summary

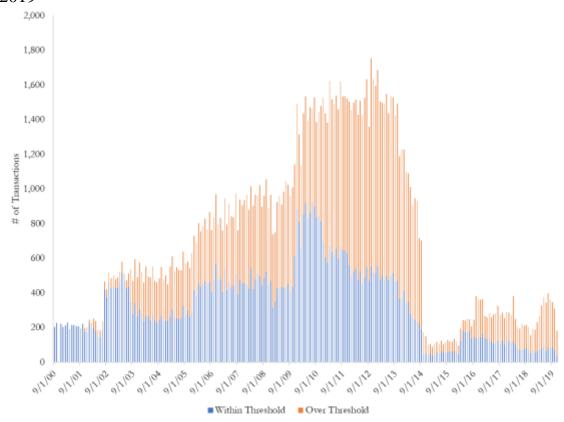
21. Supplemental Table 40 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold.

Supplemental Table 40 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	0	0.0%
2001	2,906,501	64,386	2.2%
2002	6,113,438	752,772	12.3%
2003	12,407,747	2,889,624	23.3%
2004	13,065,304	5,989,087	45.8%
2005	15,173,028	7,805,845	51.4%
2006	22,085,748	9,909,779	44.9%
2007	27,694,027	13,088,524	47.3%
2008	37,533,489	16,356,033	43.6%
2009	38,742,283	18,590,455	48.0%
2010	52,769,118	24,803,614	47.0%
2011	57,513,529	36,624,906	63.7%
2012	58,010,505	39,005,688	67.2%
2013	35,985,699	25,575,695	71.1%
2014	21,323,955	17,191,067	80.6%
2015	5,235,834	3,270,890	62.5%
2016	11,801,204	6,040,016	51.2%
2017	15,591,459	9,250,607	59.3%
2018	12,089,539	7,577,009	62.7%
2019	11,705,528	8,278,598	70.7%
Total	458,435,665	253,064,594	55.2%

22. Supplemental Figure 17 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology. The Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology flags 53.0% of transactions accounting for 63.2% of Dosage Units, 55.2% of MME and 58.0% of drug weight shipped into Trumbull County.

Supplemental Figure 17 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019



23. Supplemental Table 41 summarizes the transactions flagged based on the Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Approach in Trumbull County.

Supplemental Table 41 Twice Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	15,130	n/a	n/a	n/a	541	15,671
HBC Service Company	2,434	17,504	392	43	30	1,277	21,680
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	22,408	n/a	n/a	n/a	939	23,347
Wal-Mart	1,801	5,580	50	17	0	498	7,946
Walgreen Co	3,188	10,411	1,500	141	0	2,678	17,918
Total	7,423	71,033	1,942	201	30	5,933	86,562

D. Method 4: Three Times Trailing Twelve-Month Average Pharmacy Dosage Units

1. Lake County Summary

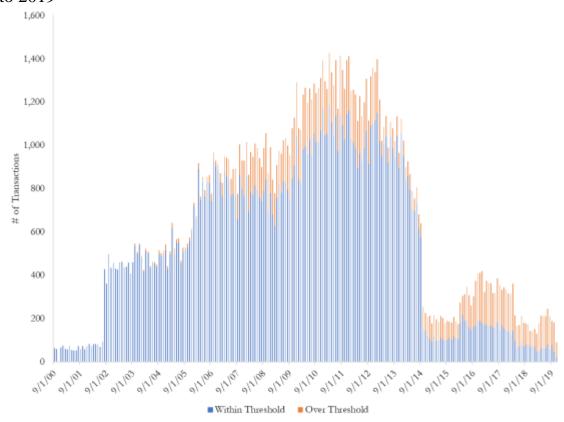
24. Supplemental Table 42 reports Total MME and % of Total MME in transactions flagged in Lake County using the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold.

Supplemental Table 42 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	0	0.0%
2001	860,018	0	0.0%
2002	5,248,812	0	0.0%
2003	13,080,589	98,680	0.8%
2004	14,812,415	584,783	3.9%
2005	18,006,836	678,757	3.8%
2006	27,694,352	1,059,762	3.8%
2007	32,917,019	6,478,127	19.7%
2008	36,450,880	13,366,098	36.7%
2009	39,574,741	14,751,071	37.3%
2010	44,625,937	19,280,478	43.2%
2011	47,450,511	20,437,160	43.1%
2012	41,680,846	18,403,454	44.2%
2013	25,276,076	8,608,171	34.1%
2014	16,212,200	5,697,812	35.1%
2015	7,762,299	5,123,147	66.0%
2016	12,810,506	7,315,039	57.1%
2017	13,975,875	8,098,327	57.9%
2018	8,535,946	4,604,043	53.9%
2019	6,202,341	3,572,678	57.6%
Total	413,377,164	138,157,587	33.4%

25. Supplemental Figure 18 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology. The Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology flags 17.0% of transactions accounting for 20.3% of Dosage Units, 33.4% of MME and 26.9% of drug weight shipped into Lake County.

Supplemental Figure 18 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019



26. Supplemental Table 43 summarizes the transactions flagged based on the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Approach in Lake County.

Supplemental Table 43 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	0	n/a	n/a	n/a	1	1
HBC Service Company	2,853	1,434	137	0	59	277	4,760
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	0	n/a	n/a	n/a	172	172
Wal-Mart	6,637	0	777	323	0	1,427	9,164
Walgreen Co	5,804	0	3,830	358	0	989	10,981
Total	15,294	1,434	4,744	681	59	2,866	25,078

2. Trumbull County Summary

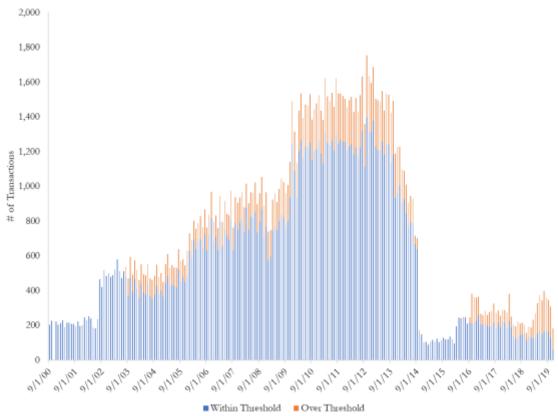
27. Supplemental Table 44 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold.

Supplemental Table 44 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	0	0.0%
2001	2,906,501	0	0.0%
2002	6,113,438	0	0.0%
2003	12,407,747	1,085,901	8.8%
2004	13,065,304	2,560,354	19.6%
2005	15,173,028	2,719,380	17.9%
2006	22,085,748	3,272,414	14.8%
2007	27,694,027	4,217,590	15.2%
2008	37,533,489	5,777,821	15.4%
2009	38,742,283	7,606,373	19.6%
2010	52,769,118	10,306,621	19.5%
2011	57,513,529	11,140,855	19.4%
2012	58,010,505	11,300,119	19.5%
2013	35,985,699	10,271,334	28.5%
2014	21,323,955	5,948,491	27.9%
2015	5,235,834	0	0.0%
2016	11,801,204	1,813,649	15.4%
2017	15,591,459	3,854,704	24.7%
2018	12,089,539	3,855,480	31.9%
2019	11,705,528	5,673,130	48.5%
Total	458,435,665	91,404,216	19.9%

28. Supplemental Figure 19 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology. The Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold methodology flags 17.7% of transactions accounting for 27.9% of Dosage Units, 19.9% of MME and 23.4% of drug weight shipped into Trumbull County.

Supplemental Figure 19 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019



29. Supplemental Table 45 summarizes the transactions flagged based on the Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Approach in Trumbull County.

Supplemental Table 45 Three Times Trailing Twelve-Month Average Pharmacy Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	5,822	n/a	n/a	n/a	240	6,062
HBC Service Company	1,285	2,262	0	19	0	645	4,211
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	11,206	n/a	n/a	n/a	664	11,870
Wal-Mart	0	0	0	0	0	152	152
Walgreen Co	0	5,773	313	0	0	504	6,590
Total	1,285	25,063	313	19	0	2,205	28,885

E. Method 5: Maximum 8,000 Dosage Units Monthly

1. Lake County Summary

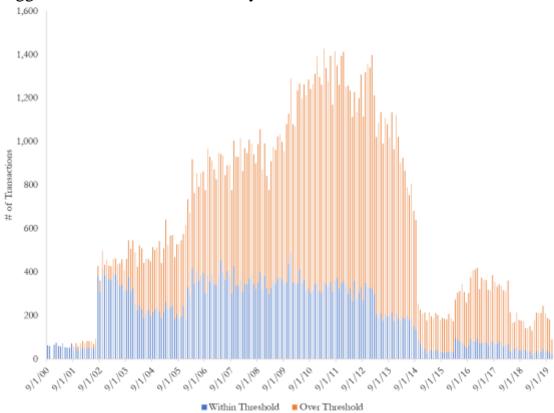
30. Supplemental Table 46 reports Total MME and % of Total MME in transactions flagged in Lake County using the Maximum 8,000 Dosage Units Monthly Threshold.

Supplemental Table 46 Maximum 8,000 Dosage Units Monthly Threshold Flagged Transactions, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	0	0.0%
2001	860,018	126,393	14.7%
2002	5,248,812	781,902	14.9%
2003	13,080,589	3,081,076	23.6%
2004	14,812,415	6,550,828	44.2%
2005	18,006,836	9,017,034	50.1%
2006	27,694,352	13,802,035	49.8%
2007	32,917,019	17,417,762	52.9%
2008	36,450,880	21,703,900	59.5%
2009	39,574,741	24,462,343	61.8%
2010	44,625,937	30,397,909	68.1%
2011	47,450,511	33,437,867	70.5%
2012	41,680,846	29,284,819	70.3%
2013	25,276,076	18,998,103	75.2%
2014	16,212,200	12,285,194	75.8%
2015	7,762,299	6,129,721	79.0%
2016	12,810,506	9,601,411	74.9%
2017	13,975,875	10,668,448	76.3%
2018	8,535,946	6,837,636	80.1%
2019	6,202,341	5,332,102	86.0%
Total	413,377,164	259,916,482	62.9%

31. Supplemental Figure 20 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Maximum 8,000 Dosage Units Monthly Threshold methodology. The Maximum 8,000 Dosage Units Monthly Threshold methodology flags 66.7% of transactions accounting for 78.5% of Dosage Units, 62.9% of MME and 62.0% of drug weight shipped into Lake County.

Supplemental Figure 20 Maximum 8,000 Dosage Units Monthly Threshold Flagged Transactions, Lake County 2000 to 2019



32. Supplemental Table 47 summarizes the transactions flagged based on the Maximum 8,000 Dosage Units Monthly Threshold Approach in Lake County.

Supplemental Table 47 Maximum 8,000 Dosage Units Monthly Threshold

Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	16,062	n/a	n/a	n/a	0	16,062
HBC Service Company	4,647	14,768	0	0	0	0	19,415
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	6,601	n/a	n/a	n/a	0	6,601
Wal-Mart	9,713	12,514	0	0	0	0	22,227
Walgreen Co	15,475	18,712	0	0	0	0	34,187
Total	29,835	68,657	0	0	0	0	98,492

2. Trumbull County Summary

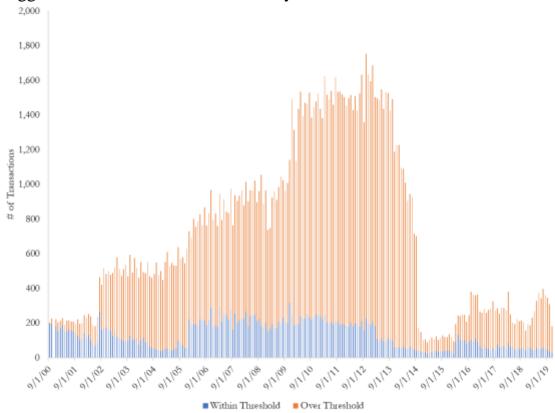
33. Supplemental Table 48 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Maximum 8,000 Dosage Units Monthly Threshold.

Supplemental Table 48 Maximum 8,000 Dosage Units Monthly Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	89,879	13.1%
2001	2,906,501	912,786	31.4%
2002	6,113,438	3,246,289	53.1%
2003	12,407,747	7,929,363	63.9%
2004	13,065,304	9,644,228	73.8%
2005	15,173,028	12,143,979	80.0%
2006	22,085,748	14,587,634	66.0%
2007	27,694,027	18,412,358	66.5%
2008	37,533,489	26,475,789	70.5%
2009	38,742,283	28,005,995	72.3%
2010	52,769,118	42,287,313	80.1%
2011	57,513,529	47,200,282	82.1%
2012	58,010,505	47,558,590	82.0%
2013	35,985,699	30,902,881	85.9%
2014	21,323,955	19,640,502	92.1%
2015	5,235,834	3,822,520	73.0%
2016	11,801,204	7,779,683	65.9%
2017	15,591,459	12,011,551	77.0%
2018	12,089,539	9,039,510	74.8%
2019	11,705,528	9,673,103	82.6%
Total	458,435,665	351,364,234	76.6%

34. Supplemental Figure 21 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Maximum 8,000 Dosage Units Monthly Threshold methodology. The Maximum 8,000 Dosage Units Monthly Threshold methodology flags 81.7% of transactions accounting for 89.7% of Dosage Units, 76.6% of MME and 75.6% of drug weight shipped into Trumbull County.

Supplemental Figure 21 Maximum 8,000 Dosage Units Monthly Threshold Flagged Transactions, Trumbull County 2000 to 2019



35. Supplemental Table 49 summarizes the transactions flagged based on the Maximum 8,000 Dosage Units Monthly Threshold Approach in Trumbull County.

Supplemental Table 49 Maximum 8,000 Dosage Units Monthly Threshold Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	18,696	n/a	n/a	n/a	0	18,696
HBC Service Company	4,666	29,341	0	0	0	0	34,007
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	33,145	n/a	n/a	n/a	0	33,145
Wal-Mart	2,179	12,892	0	0	0	0	15,071
Walgreen Co	11,225	21,334	0	0	0	0	32,559
Total	18,070	115,408	0	0	0	0	133,478

F. Method 6: Maximum Daily Dosage Units

1. Lake County Summary

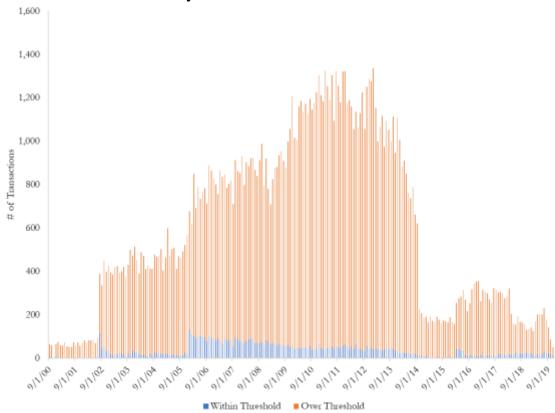
36. Supplemental Table 50 reports Total MME and % of Total MME in transactions flagged in Lake County using the Maximum Daily Dosage Units Threshold.

Supplemental Table 50 Maximum Daily Dosage Units Threshold Flagged Transactions, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	183,958	92.5%
2001	860,018	859,875	100.0%
2002	3,988,622	3,282,490	82.3%
2003	9,489,680	8,965,558	94.5%
2004	10,965,238	10,432,384	95.1%
2005	12,792,916	12,271,250	95.9%
2006	21,877,421	19,583,283	89.5%
2007	25,984,886	24,074,307	92.6%
2008	30,447,290	28,752,610	94.4%
2009	32,744,094	31,476,834	96.1%
2010	38,049,333	37,056,266	97.4%
2011	40,404,222	39,533,673	97.8%
2012	36,068,688	35,217,388	97.6%
2013	23,054,962	22,263,312	96.6%
2014	14,792,730	14,282,941	96.6%
2015	6,696,794	6,591,083	98.4%
2016	10,939,840	10,295,291	94.1%
2017	11,565,248	11,301,288	97.7%
2018	7,658,674	7,232,877	94.4%
2019	5,223,854	4,773,369	91.4%
Total	343,803,472	328,430,037	95.5%

37. Supplemental Figure 22 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Maximum Daily Dosage Units Threshold methodology. The Maximum Daily Dosage Units Threshold methodology flags 94.2% of transactions accounting for 95.4% of Dosage Units, 95.5% of MME and 85.5% of drug weight shipped into Lake County.

Supplemental Figure 22 Maximum Daily Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019



38. Supplemental Table 51 summarizes the transactions flagged based on the Maximum Daily Dosage Units Threshold Approach in Lake County.

Supplemental Table 51 Maximum Daily Dosage Units Threshold Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	20,851	n/a	n/a	n/a	735	21,586
HBC Service Company	4,772	16,983	0	0	n/a	3	21,758
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	12,575	n/a	n/a	n/a	83	12,658
Wal-Mart	11,110	14,666	1,483	388	n/a	282	27,929
Walgreen Co	17,378	21,486	5,346	912	n/a	159	45,281
Total	33,260	86,561	6,829	1,300	n/a	1,262	129,212

2. Trumbull County Summary

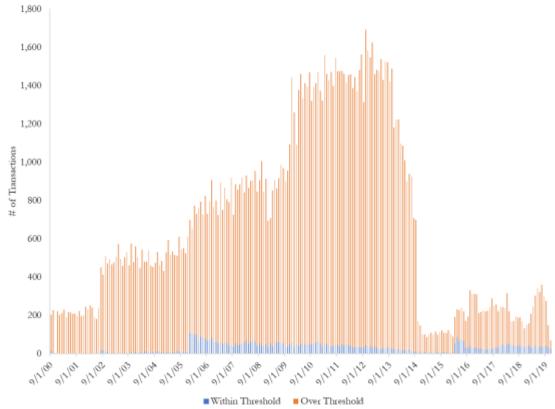
39. Supplemental Table 52 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Maximum Daily Dosage Units Threshold.

Supplemental Table 52 Maximum Daily Dosage Units Threshold Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	676,700	98.4%
2001	2,906,501	2,906,501	100.0%
2002	5,763,343	5,589,485	97.0%
2003	11,265,494	11,190,963	99.3%
2004	11,822,482	11,579,973	97.9%
2005	13,343,913	13,018,539	97.6%
2006	19,446,383	17,316,603	89.0%
2007	24,137,380	22,853,821	94.7%
2008	32,041,680	31,023,150	96.8%
2009	33,335,947	32,346,551	97.0%
2010	47,290,554	46,297,436	97.9%
2011	52,357,594	51,470,473	98.3%
2012	53,714,995	52,968,484	98.6%
2013	34,876,765	34,328,930	98.4%
2014	21,178,120	20,776,528	98.1%
2015	4,983,376	4,655,256	93.4%
2016	10,066,567	8,478,376	84.2%
2017	12,644,198	11,878,361	93.9%
2018	9,707,178	8,445,606	87.0%
2019	9,458,073	8,620,899	91.1%
Total	411,028,276	396,422,635	96.4%

40. Supplemental Figure 23 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Maximum Daily Dosage Units Threshold methodology. The Maximum Daily Dosage Units Threshold methodology flags 95.6% of transactions accounting for 97.1% of Dosage Units, 96.4% of MME and 89.9% of drug weight shipped into Trumbull County.

Supplemental Figure 23 Maximum Daily Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019



41. Supplemental Table 53 summarizes the transactions flagged based on the Maximum Daily Dosage Units Threshold Approach in Trumbull County.

Supplemental Table 53 Maximum Daily Dosage Units Threshold Flagged Transactions, Trumbull County 2000 to 2019

Hydromorphone Oxymorphone Hydrocodone Oxycodone Morphine Other # of Flagged **Transactions CVS** 19,022 308 19,330 n/a n/a n/a n/a 33,651 **HBC Service Company** 4,261 29,238 0 18 n/a 134 Omnicare Distribution n/a n/a n/a n/a n/a n/a n/a Rite Aid 37,719 38,073 n/a n/a n/a n/a 354 20,209 Wal-Mart 5,672 14,263 52 17 205 n/a 12,927 Walgreen Co 21,563 2,731 205 n/a 702 38,128 149,391 Total 22,860 121,805 240 1,703 2,783 n/a

G. Method 7: Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units

1. Lake County Summary

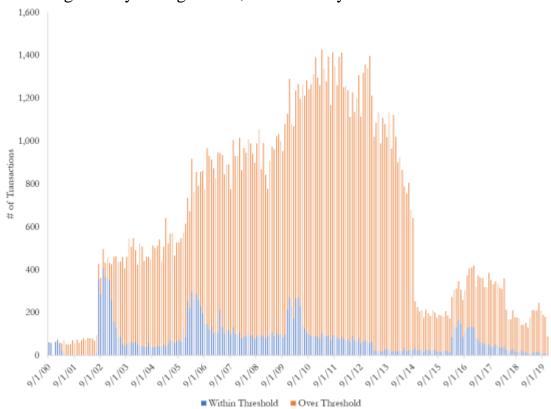
42. Supplemental Table 54 reports Total MME and % of Total MME in transactions flagged in Lake County using the Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units.

Supplemental Table 54 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units, Lake County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	198,963	0	0.0%
2001	860,018	699,520	81.3%
2002	5,248,812	1,101,219	21.0%
2003	13,080,589	7,681,981	58.7%
2004	14,812,415	10,619,784	71.7%
2005	18,006,836	12,319,689	68.4%
2006	27,694,352	17,987,188	64.9%
2007	32,917,019	24,671,659	75.0%
2008	36,450,880	29,678,872	81.4%
2009	39,574,741	31,837,313	80.4%
2010	44,625,937	36,943,000	82.8%
2011	47,450,511	40,498,564	85.3%
2012	41,680,846	36,095,577	86.6%
2013	25,276,076	22,953,481	90.8%
2014	16,212,200	14,580,016	89.9%
2015	7,762,299	6,591,083	84.9%
2016	12,810,506	6,559,353	51.2%
2017	13,975,875	10,777,255	77.1%
2018	8,535,946	7,451,765	87.3%
2019	6,202,341	5,769,625	93.0%
Total	413,377,164	324,816,944	78.6%

43. Supplemental Figure 24 illustrates total opioid transactions from Distributors to retail and chain pharmacies into Lake County from 2000 to 2019 and those transactions which would be flagged by the Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units methodology. The Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units methodology flags 87.4% of transactions accounting for 94.5% of Dosage Units, 78.6% of MME and 92.7% of drug weight shipped into Lake County.

Supplemental Figure 24 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units, Lake County 2000 to 2019



44. Supplemental Table 55 summarizes the transactions flagged based on Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Approach in Lake County.

Supplemental Table 55 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Flagged Transactions, Lake County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	20,015	n/a	n/a	n/a	1,304	21,319
HBC Service Company	4,128	15,908	159	0	18	489	20,702
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	12,240	n/a	n/a	n/a	595	12,835
Wal-Mart	11,288	14,747	1,446	437	0	676	28,594
Walgreen Co	17,214	20,519	5,238	1,049	17	1,603	45,640
Total	32,630	83,429	6,843	1,486	35	4,667	129,090

2. Trumbull County Summary

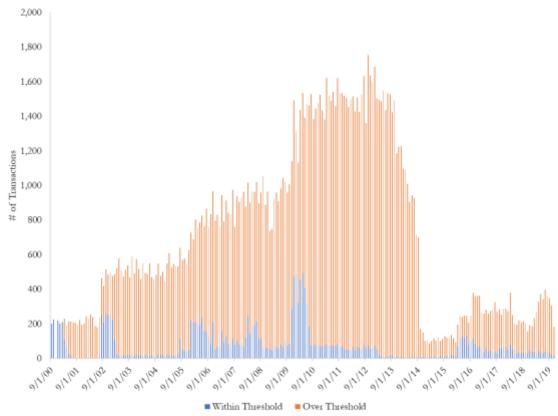
45. Supplemental Table 56 reports Total MME and % of Total MME in transactions flagged in Trumbull County using the Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units.

Supplemental Table 56 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Flagged Transactions, Trumbull County, Total MME and % MME

	Defendants'		
Year	Total MME	Flagged MME	%
2000	687,732	0	0.0%
2001	2,906,501	2,238,219	77.0%
2002	6,113,438	3,434,133	56.2%
2003	12,407,747	10,502,948	84.6%
2004	13,065,304	11,654,626	89.2%
2005	15,173,028	12,830,266	84.6%
2006	22,085,748	16,332,369	73.9%
2007	27,694,027	22,278,442	80.4%
2008	37,533,489	29,397,448	78.3%
2009	38,742,283	31,916,194	82.4%
2010	52,769,118	43,926,012	83.2%
2011	57,513,529	52,005,871	90.4%
2012	58,010,505	53,481,417	92.2%
2013	35,985,699	34,692,388	96.4%
2014	21,323,955	20,939,147	98.2%
2015	5,235,834	4,655,256	88.9%
2016	11,801,204	7,450,891	63.1%
2017	15,591,459	12,842,607	82.4%
2018	12,089,539	9,405,734	77.8%
2019	11,705,528	10,023,911	85.6%
Total	458,435,665	390,007,880	85.1%

46. Supplemental Figure 25 illustrates total opioid transactions from Distributors to pharmacies into Trumbull County from 2000 to 2019 and those transactions which would be flagged by the Maximum Monthly, Trailing Sixmonth Threshold on Rolling 30-Day Dosage Units methodology. The Maximum Monthly, Trailing Sixmonth Threshold on Rolling 30-Day Dosage Units methodology flags 89.3% of transactions accounting for 95.0% of Dosage Units, 85.1% of MME and 93.2% of drug weight shipped into Trumbull County.

Supplemental Figure 25 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Flagged Transactions, Trumbull County 2000 to 2019



47. Supplemental Table 57 summarizes the transactions flagged based on the Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Approach in Trumbull County.

Supplemental Table 57 Maximum Monthly, Trailing Six-month Threshold on Rolling 30-Day Dosage Units Flagged Transactions, Trumbull County 2000 to 2019

# of Flagged Transactions	Oxycodone	Hydrocodone	Morphine	Hydromorphone	Oxymorphone	Other	Total
CVS	n/a	18,184	n/a	n/a	n/a	830	19,014
HBC Service Company	4,522	26,845	276	0	0	612	32,255
Omnicare Distribution	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rite Aid	n/a	36,450	n/a	n/a	n/a	1,394	37,844
Wal-Mart	5,901	13,459	52	0	0	444	19,856
Walgreen Co	12,598	20,629	2,439	148	0	1,019	36,833
Total	23,021	115,567	2,767	148	0	4,299	145,802

III. Conclusion

48. I reported the results of applying the non-exhaustive set of algorithms for flagging transactions to the transactions attributable to the processed ARCOS data supplemented with the missing transactions found in the Defendants' Transactional Data.

49. I continue to review documents and gather information and reserve the right to update my analysis and opinions based upon that further review of documents and based on any new information including, possibly, reports of other experts - I may receive.

Signature of Expert

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